MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2016/2017

PTR0015 – TRIGONOMETRY

(All sections / Groups)

22 OCTOBER 2016
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **FOUR (4)** printed pages including the cover page and the appendix with 4 questions only.
2. Answer all **FOUR (4)** questions
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculators are allowed.

Question 1 (25 Marks)

a) Solve the following and write in the standard form.

i. $z = (3 - 2i) - (-3 - 2i)$ **(3 marks)**

ii. $z = (4 + 3i)(2 - 2i)$ **(4 marks)**

iii. $z = \frac{3+2i}{5-12i} + \frac{6-i}{3-4i}$ **(10 marks)**

b) Convert the following rectangular coordinates to polar coordinates.

i. $(1, -1)$ **(4 marks)**

ii. $(-2, -2\sqrt{3})$ **(4 marks)**

Question 2 (25 Marks)

a) Find the equation of the lines that parallel and perpendicular to the line $4x - 5y = 13$ and containing the point $(-2, -5)$. Then, sketch the lines **(9 marks)**

b) Write an equation for the line that passes through $(3, -2)$ and $(7,6)$. **(4 marks)**

c) The Cartesian equation of an ellipse is given by,

$$3x^2 + 2y^2 - 6x + 12y + 15 = 0$$

i. Express the Cartesian equation of the ellipse in the standard form. **(8 marks)**

ii. Determine the coordinates of the center and foci of the ellipse. **(4 marks)**

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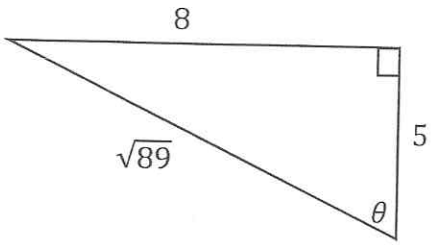
Question 3 (25 Marks)

a) Find the six trigonometric function values of θ.



(6 marks)

b) Evaluate the following.

i. $\sin(x+y)$ given $\sin x = \frac{8}{17}$ and $\sin y = \frac{3}{5}$. **(4 marks)**

ii. $\sin 2\theta$ given $\cos\theta = -\frac{3}{5}$ and θ is in quadrant III. **(3 marks)**

c) Simplify the expression of

$$\tan\left[\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)\right]$$ **(6 marks)**

d) Solve ΔABC given $a = 5, B = 96°, C = 15°$ **(6 marks)**

Question 4 (25 Marks)

a) Given $A = \begin{bmatrix} 6 & 4 \\ -3 & 2 \\ 1 & 0 \end{bmatrix}, B = \begin{bmatrix} 5 & 0 \\ -2 & 6 \end{bmatrix}, C = \begin{bmatrix} -1 & 2 \\ 4 & 7 \end{bmatrix}$

Find

i. $2B + C$ **(3 marks)**
ii. AB **(4 marks)**
iii. BC **(4 marks)**

b) Solve the system using Cramer's Rule. **(14 marks)**

$$\begin{aligned} 2x + y - 5z &= 0 \\ -3x - 4y + z &= 2 \\ -x + 2y + 8z &= 6 \end{aligned}$$

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APPENDIX

Trigonometric Identities

$$\cos^2 A + \sin^2 A = 1$$
$$\sec^2 A = 1 + \tan^2 A$$
$$\csc^2 A = 1 + \cot^2 A$$

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$
$$\cos(A-B) = \cos A \cos B + \sin A \sin B$$
$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$
$$\sin(A-B) = \sin A \cos B - \cos A \sin B$$
$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$
$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$\cos 2A = 2\cos^2 A - 1$$
$$\sin 2A = 2\sin A \cos A$$
$$\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$$

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